



The Minuteman Repeater Association

A non-profit organization providing communications infrastructure and volunteers for community and emergency events.



The Minuteman

Volume 45, Number 6

May 2016

Annual Meeting ~ Wednesday, May 25 ~ 7 PM

MMRA Officers Report to Members & General Election ►

**** plus ****

Programming Your Radio with CHIRP

James Lee N1DDK

Location: Northborough Public Library (see page 3) ~ Talk-in 147.27

CHIRP is universal software that supports programming of just about any modern radio. N1DDK will show us how easy it is to use. Best of all, the software is FREE!

James was originally licensed as KA1KUB in 1982. He became active developing Chirp software when he purchased a TYT9800 quad band 6, 10, 2, 440 mobile radio and wanted to easily program it. He is currently a hardware development Engineer for Qualcomm in Boxborough.

Nominations

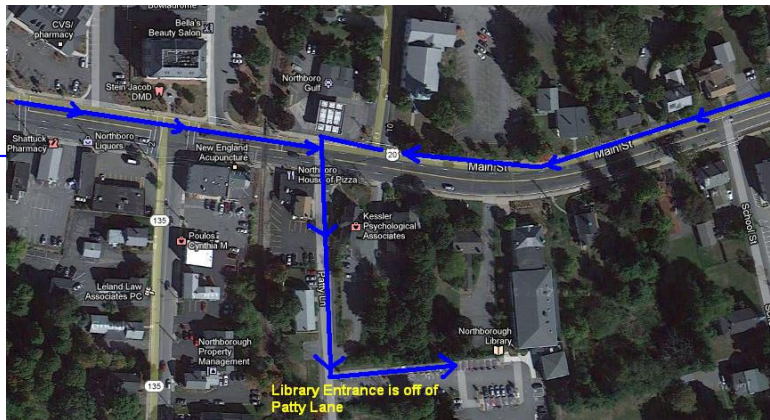
- ◆ David Wolfe, KG1H
President
- ◆ Mike Neilsen, W1MPN
Vice President,
- ◆ John McGovern, W1JMC
(incumbent) Secretary
- ◆ Kevin Paetzold, K1KWP
(incumbent) Treasurer
- ◆ Bob Evans, N1BE
(incumbent) Clerk
- ◆ Clark Conti, N1NVK
(incumbent)
for Director > 2018
- ◆ James Lee, N1DDK
Director > 2018.

LIBRARY PARKING Patty Lane is right across from the Gulf station. Follow Patty Lane to the library parking lot. The red brick building next to the library has a tempting driveway, being right next to the library, but it is private property. Please respect the owners' property, and use the library lot. Additional parking is available on the corner of Hudson and Pierce, or at Town Hall.

Traffic exiting Patty Lane should stay to far right, even for left turns, to avoid traffic turning in. The lane closest to the pizza shop is for INCOMING traffic ONLY from Rt. 20 east-bound.

Directions from I-495:

- From I-495, take Exit 24B which is Rt. 20 West toward Northborough.
- Follow Rt. 20 West about 3.5 miles, into the center of Northborough.
- Opposite the Gulf Station on the right, turn left into Patty Lane.
- The Northborough Free Library parking lot will be on the left.



<http://northboroughlibrary.org/northborough/hours.asp>

Note: MMRA bylaws require that anyone who wishes to receive a paper copy of the Newsletter remit an additional \$10 each membership year.

THIS IS THE LAST PAPER COPY THAT WILL BE MAILED TO THOSE WHO HAVE NOT PAID THIS ADDITIONAL AMOUNT.

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About the Minuteman Repeater Association

The Minuteman Repeater Association (MMRA) is dedicated to Amateur Radio and public service. The MMRA maintains a large system of repeaters in Eastern Massachusetts.

The MMRA meets (usually) on the 3rd Wednesday of each month from September to June. Meeting times, locations, and talk-in frequency vary and are announced in this newsletter and on weekly nets. Meetings are open to all interested parties. Guest speakers and programs of general interest occur in September, November, January, March, and May. The intervening meetings are also open to all members and are for general business.

The Minuteman newsletter is Emailed one week before each general interest meeting. Members are encouraged to submit articles which can be sent to the editor at newsletter@mmra.org. The deadline for articles is the last Friday of the month preceding the meeting.

Each Tuesday evening at 8PM the MMRA links most of the repeaters for an open net. The topic is "Technical Information and Other Stuff". Join us!

Membership in the MMRA is open to all radio amateurs. Annual dues are \$25 per individual or \$35 per family. See our website for details.

Email to the club leadership should be sent to contact@mmra.org. The MMRA maintains a web site at: <http://www.mmra.org/>

An email distribution list for club members named "MMRA" is at: www.yahooogroups.com/.

You can also follow us on twitter @mmraham and like us on Facebook: <https://www.facebook.com/mmraham>.

MMRA QRM Policy

MMRA members and all other operators are strongly encouraged to report repeater activity that does not abide by Part 97 rules or accepted amateur radio practice to the board of directors at contact@mmra.org or via other means.

The most effective way (and probably the only effective way) to deal with an individual causing QRM is to NOT engage that individual on the air. Please include the time and date of any incident. Measures are being taken to make audio recordings of repeater activity.

Repeater and Frequency Information

Band	XMTR Location	Freq	PL	Call	Linking	
					To Hub 1	To Hub 2
MMRA Voice Repeaters						
10m	Marlborough	29.680	131.8	W1MRA	PTL	PTL
6m	Marlborough	53.810	71.9	W1BRI	PTL	PTL
Remote receive in Hopkinton PLin = 173.8						
2m	Brookline	145.160	na	K1MRA	D-Star	
	Belmont	145.430	146.2	N1DDK	PTL	FTL: DARI
	Mendon	146.610		K1KWP	FTL	PTL
	Quincy	146.670		W1BRI	PTL	PTL
	North Reading	146.715		KC1US	PTL	PTL
	Weston	146.790		N1BE	PTL	PTL
	Boston	146.820		K1BOS	FTL	PTL
	Remote receive in Brookline Boston: PLin = 127.3					
Marlborough	147.270	146.2	W1MRA	PTL	PTL	
1½m	Hopkinton	223.940	103.5	KB1LOY	PTL	FTL
	Quincy	224.400		N1KUG	PTL	FTL
	Weston	224.700		N1NOM	PTL	FTL
	Marlborough	224.880		W1MRA	PTL	FTL
70cm	Lowell	442.250	88.5	K1LVF	FTL	PTL: 446.775
	Weston *	442.700		KG1H	Network Hub 2 (PTL to Hub 1)	
	North Reading	446.775		W1DYJ	FTL	PTL
	Marlborough	448.225	na	W1MRA	D-Star	
	Hopkinton	449.575	88.5	W1BRI	PTL	PTL
	Marlborough *	449.925		W1MRA	Network Hub 1	
33cm	Boston *	927.0625	D244	K1RJZ	PTL	PTL
	Marlborough *	927.700		W1MRA	PTL	PTL
PL out = 131.8						
Marlborough		144.390	none	W1MRA	APRS Digipeater	
???		145.630	146.2	W1MRA	Fox Box	
*Internet	HUB1- 449.925: IRLP node 4133 / Echolink node 4133					
	HUB2 - 442.700: IRLP node 4136; Connected to 220 Reflector 9124 on Tuesdays					
	927.0625: IRLP 4977			Normally linked to the NE900 Reflec- tor, 9125. Linked to MMRA via IRLP for the TIAOS net. Normally linked		
	927.700: IRLP 4978					

Notes: FTL = Full Time Linked (or default state) PTL = Part Time Linked (on schedule or demand)

President's Corner ~ Bob DeMattia ~ K1IW

When I wrote my first president's corner in September 2004, I outlined where we were as a club and some areas I'd work to improve. My main concern was meeting attendance, which ranged from maybe a dozen at some meetings to occasionally close to forty. I'm happy to report that at our last few general meetings, the average has moved to about 25, though the maximum is still about forty. Progress, yes - but it's taken us twelve years to improve to this point.

Activity at other club events is good - we have the core group of officers and directors. We also have another dozen and a half that will show up for the occasional work parties. We've had no shortage of volunteers at recent projects such as the Sligo renovation or the Burlington relocation.

Our biggest growth has been in memberships and repeaters. When I took the reigns, I recall club membership being around 120-130 members. We now have 264 active memberships. The club has gone from operating twelve repeaters to twenty-two: two of the new ones are digital technology and another two are on the 900MHz band - a band that had an entirety of six operating repeaters in Eastern Massachusetts, by any club, in '04.

Going forward, I hope to see the club continue to grow. While we have spent significant cash on new systems and upgrading old ones, we are on solid financial ground thanks to the wisdom of the MMRA governing board. I would be remiss if I didn't call out Rick Zach K1RJZ, who through his connections gave the club access to the largest and most successful fund raising effort the club has ever seen. The Sligo renovation project may not have been possible without these funds.

I'd also like to thank Larry Banks, who has been our newsletter editor since May 2006. It is one of the best club newsletters that I am familiar with. Thanks go to Kevin Paetzold K1KWP for the onerous tasks of managing the club's finances, John McGovern W1JMC for fighting with the club's membership database, Bob Evans for recording our minutes and filing our corporation status with the commonwealth, and Steve Telsey, N1BDA for being my backup. All of these officers have been with the club throughout my term. Finally, I'd like to thank Bryan Cerqua who keeps our systems running. Without this team, the club would not keep running.

But that team can always use your help. I'd like to ask all our club members, to please consider getting involved. Come to one of our events - volunteer to help at the Boxboro convention in September, or just join us at the club banquet table. Maybe you'd like to assist with keeping one of our repeaters running, or maybe being a net control on our Tuesday night net. The opportunities are all out there for you - summarized neatly in this bimonthly newsletter.

As I retire from my role as president, I believe the club is in a good position to keep growing. My many thanks to all our members - your continue membership provides the funds that enable the club to do great things. It has been an honor to serve as your club president.

73, Bob DeMattia, K1IW



SEPTEMBER 9, 10, & 11
At the Holiday Inn in Boxborough, MA

Major Manufacturers!

Flea Markets!

First-Class Forums and Seminars!

Friday DXCC/Contest Dinner with David Collingham K3LP of the VP8S DXpedition

PRIZES!
PRIZES!
PRIZES!

See <http://www.boxboro.org> for info and to purchase tickets
Tickets also available at Ham Radio Outlet in Salem, NH and
at Electronics Plus in Littleton, MA

The MMRA needs people the help at the Convention.
Contact David, KG1H, for details: KG1H@MMRA.org

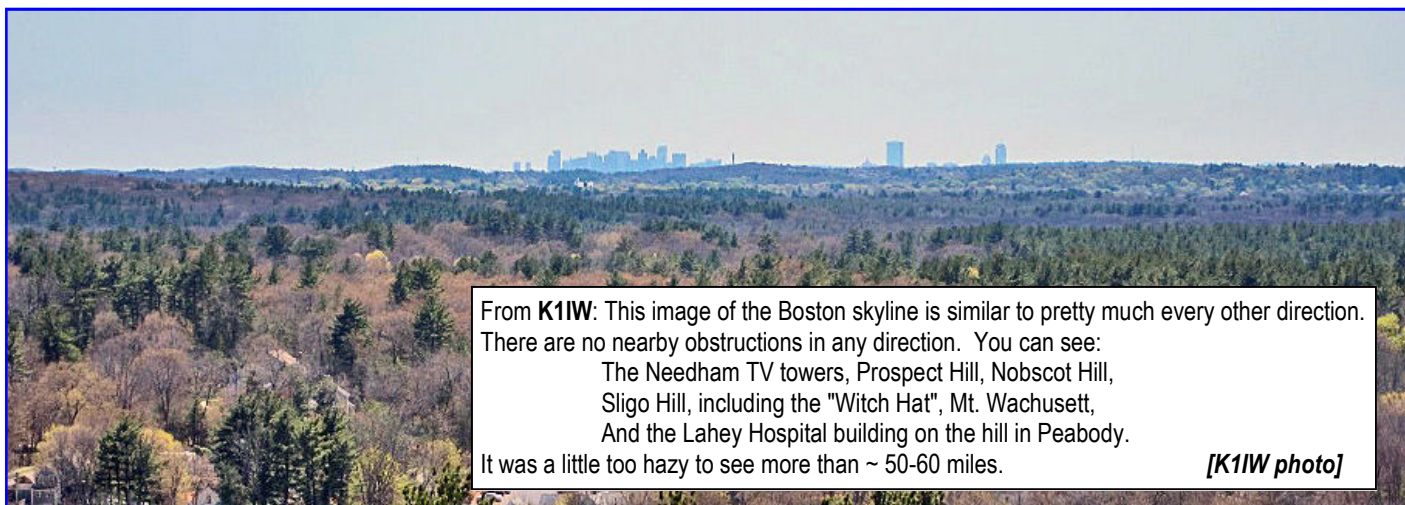
Burlington Repeaters have moved to North Reading

The MMRA Burlington repeaters - 146.715 and 446.775 have been relocated to North Reading. Input PL has not changed. This site is expected to improve coverage, especially to the North, but generally in all directions.

Please give them a try and send us your signal reports! Some photos from the move are below. (KG1H photos unless noted.)

Thanks to **K3FG**, **KC1US**, **N1NVK**, **WH6DSN**, **WA1MDD**, **KG1H**, and **KC1DRH**. Without any of you, this would not have been possible! **Kevin**, **KC1DRH**, is also our contact in North Reading who got us access to the site - so a special thanks to him for doing this, and for climbing the tower and working with me at the top to install the antennas.

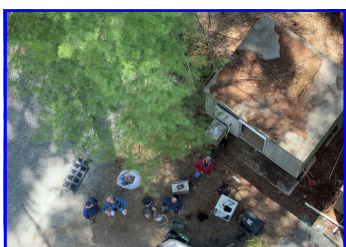
Bob DeMattia, K1IW



Burlington — the old



North Reading — the new



Marathon Thank You letter

From: Matthew Forman
 Subject: Thank You for your Support during the 2016 Boston Marathon
 Date: April 25, 2016 at 5:27:59 AM EDT
 To: kg1h@mmra.org

Good Morning David,

As we approach the one week mark since the 120 Running Boston Marathon I wanted to take a moment an express my sincere gratitude towards you and the organization your represent for allowing us to use your amateur radio infrastructure during the Marathon. Your equipment helped approximately 280 communication volunteers provide a critical communication network for the Boston Athletic Association as well as numerous public safety and event partners.

Initial reports indicate that everything went extremely well and that is in no small part to the robust communications you and your organization helped enable.

If you have any feedback with regards to how things went in 2016 or feel we could improve in any way for 2017 please feel free to let us know. You can always reach me directly at k6mcf@HamRadioBoston.org or the Amateur Radio Communication Committee at contact@HamradioBoston.org.

Thank You,
 Matthew Forman
 310-806-1273
 k6mcf@HamRadioBoston.org
 Chain, Technical Infrastructure Committee
 BAA Communication Committee

Public Service Report

David Wolfe, KG1H

Public Service Events sponsored by the MMRA or other ham organizations that members of the MMRA participate in and/or MMRA repeaters support:

Sutton Chain of Lights – 05 Dec 2015
 Ashland Half-Marathon & 5K Race – 19 March 2016
 2016 Boston Marathon – 18 April 2016
 Run of the Charles – 24 April 2016
 Westford Kiwanis Apple Blossom Parade– 14 May 2016
 Brain Tumor Association Boston Ride– 15 May 2016
 Wellesley Parade, 22 May 2016

Your Board of Directors at work...



April Business Meeting

Bob Evans, Clerk, N1BE

The MMRA board met for a business meeting at the new office of Stratus in Maynard, MA at 7:00 PM on April 27. In attendance were K1KWP, N1DDK, W1DYJ, N1BE, W3EVE, W1BRI, KG1H, W1MPN, N1BDA, N1NVK and K1IW.

The first agenda item was a Treasurer Report by K1KWP reviewing income, expenses and balances. Kevin reminded us that MMRA fiscal years run from June 1 through the following May 31st. No deficit is expected with the projected spending for this year being less than the projected income.

Kevin also reviewed a list of past members who did not renew this year. We have some concern because the number of such ex-members is higher than in any recent year.

Bob, K1IW, then led a discussion of status of various repeaters as follows.

- ◆ In Hopkinton, the situation has not changed. We have a 220MHz repeater and link radio. With advance notice, we can access the radios but antenna work is not possible.
- ◆ Bob is in discussions to find a new home for the 449.575 machine in Hopkinton. The board approved an expenditure not to exceed \$300 to purchase equipment for using this 70-cm repeater at another site.
- ◆ The Burlington repeater is scheduled to move to North Reading on April 30. K1IW has enlisted about 6 volunteers to help do this move. We expect no equipment expenses associated with this move.
- ◆ The split-site MRE/Weston 10-M repeater has receive problems at both sites. K1IW took the link receiver from the MRE half of this repeater to his house to investigate PL decode problems. W1BRI volunteered to go to Weston to investigate cause of poor 10-M receive sensitivity. The board considered purchase of a new 10-M receive antenna for Weston, but took no action pending the result of Bryan's investigation.
- ◆ The IRLP node 4136 is still in the process of being built by K1IW.

The board discussed sharing the Quincy site with a GMRS repeater. We had concerns about how to provide access to the site while maintaining security of our equipment. We also wanted to be reimbursed for electricity use by GMRS and some of our costs to be at Quincy. W1BRI was selected to represent the MMRA in discussions with this group. The board approved these terms: rent is \$300 per year, paid in advance. Site access will be possible only when an MMRA trustee is present.

Two of our repeater power supplies need replacing. The linear 12V power supply at Clay Center emits a disturbing hum. At MRW, we chose to replace the power with a more efficient one to reduce the electric utility cost. The board approved an expenditure of \$220 for a metered rack-mount Astron switching power supply for the Clay Center, and an expenditure not to exceed \$300 for a metered rack-mount switching power supply with a provision for battery backup for Sligo.

James, N1DDK, reported problems with pests entering the MRE shelter and a rotting wooden mast that needs replacing. The board approved an expenditure not to exceed \$300 to effect repairs and to construct a "tilt-a-ma-jig" in place of the mast.

This work is not scheduled, but will be coordinated with a June work party to do yard work and general maintenance at the site.

Mike, W1MPN, reported the following slate has been selected by the Nomination Committee:

- ◆ David Wolfe, KG1H, for President,
- ◆ Mike Neilsen, W1MPN, for Vice President,
- ◆ John McGovern, W1JMC, (incumbent) for Secretary,
- ◆ Kevin Paetzold, K1KWP, (incumbent) for Treasurer,
- ◆ Bob Evans, N1BE, (incumbent) for Clerk,
- ◆ Clark Conti, N1NVK, (incumbent) for Director through May 2018,
- ◆ James Lee, N1DDK for Director through May 2018.

Steve Schwarm, W3EVE, and Roger Coulson, WA1NVC will continue as Directors in terms that run through May, 2017.

Outgoing president, Bob DeMattia, K1IW, indicated his willingness to assume a seat on the Executive Board as an additional director for a term of one year, in accordance with the MMRA bylaws.

W1MPN also provided an update from the budget committee that was mentioned in the January 2016 newsletter. With the change in board membership, it was too early to lock into a budget before the annual meeting in May. Consequently Mike and the board plan to develop a long range technology and financial plan after the elections. The board is in general agreement that this needs to be done.

We discussed a new trustee for Belmont but took no action.

K1IW reminded us that the Boxboro! convention is on Sept 9, 10, 11. The MMRA efforts for the event is being coordinated by KG1H. K1IW advocated for again, like last year, getting an MMRA table together for the Saturday dinner. This gets one a seat with fellow MMRA members and saves a few dollars on the cost of your dinner. Contact K1IW or KG1H if you are interested.

Steve, W3EVE, followed up with the board on his action item with MAVOAD. The MMRA is now signed up with the MAVOAD network, but we have had little communication with them. National VOAD (Voluntary Organizations Active in Disaster) is recognized nationwide as the non-governmental leader building community resiliency throughout the disaster cycle.

Per the bylaws, the board moved to stop sending paper newsletters at no cost after May 2016. Newsletters will not be sent by US mail to anyone who has not paid an additional \$10 per year to cover the costs of printing and mailing.

The meeting adjourned at 8:45 PM.

**Next MMRA Business Meeting:
Wednesday 15 June, 7PM
Location: Stratus, Maynard**

March Membership Meeting

Antenna Modeling ~ Larry Banks, W1DYJ

Larry's presentation started with some history about why Larry started modeling antennas. It then highlighted the various software packages available in three ARRL Books: The Handbook, OH4UN's Low Band DXing, and The Antenna Book. Using some of his homebrew antennas as examples, Larry showed how to use four packages – TLW, YW, HFTA, and EZNEC.


A few of his slides are below.

W1DYJ Larry Banks

Antenna Modeling "101"

Based on ARRL Antenna Book SW

Much cheaper (and faster) than (re)building them!



Larry Banks, W1DYJ
First licensed: 1962 (KN1VFX)
W1DYJ since 1966 - Amateur Extra
10 Matthews Way, Harpswell, ME
33 Blueberry Hill Road, Woburn, MA

Minuteman Repeater Association
March 2016

W1DYJ Larry Banks

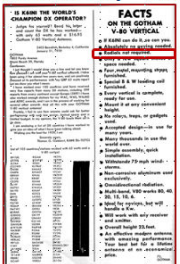
Agenda

- Some W1DYJ background
- A brief view of ARRL Software
 - ARRL Handbook
 - OH4UN's Low Band DXing
 - The Antenna Book
- TLW
- YW
- HFTA
- EZNEC

And hopefully you will learn some theory and gain some understanding about antennas in general...

W1DYJ Larry Banks

An antenna story ~ the Gotham V80 (1962)



FACTS ON THE GOTHAM V-80 VERTICAL

- Newbie KN1VFX
- My first antenna for 80M
- 16.95 was "big bucks" for a sophomore in HS in 1962
- I knew nothing about antennas
- Never worked - Best DX was a 40M OO report: "Out of Band"
- Have not believed advertisements since!
- I also now believe you need to understand the physics of antennas

→→→ modeling

W1DYJ Larry Banks

SW: ARRL Handbook (89th Edition - 2012)

- TubeCalculator** Design tube-type High Power linears
- ClassE** Designs single-ended Class E RF amplifier
- Diplexer** Designs both high-pass/low-pass and band-pass/band-stop types of diplexers
- Helical** Designs and analyzes helical-resonator bandpass filters usually used in VHF and UHF
- Elsie** A lumped-element filter design and analysis program (the student edition)
- MeterBasic** Designs and prints professional-quality analog meter scales
- QotLowpass** Designs and analyzes transmitter output low-pass filters
- PIEL** Designs and analyzes pi-L networks for transmitter output
- QuadNet** Designs and analyzes active quadrature networks
- SVCFilter** Standard-value component routine to design low-pass and high-pass filters
- Supplemental Files** Additional discussion, additional projects, full-size PC board etching patterns, program examples and other useful information

W1DYJ Larry Banks

SW: ARRL OH4UN's Low Band DXing (4th Edition - 2005-2007)

- Conversion calculator** Excel spreadsheet that converts signal levels typically encountered at receiver inputs between μV , mV , $dB\mu V$, μW , etc
- Receiver Levels** Excel spreadsheet tool shows you levels involved with radio signals from transmit power to received signal
- RX noise figure and MDS calculation** Excel spreadsheet tool shows you the relation between receiver bandwidth, temperature and receiver MDS
- OH4UN Low-Band DXing Software** Propagation Software: Mutual Impedance and Driving Impedance; Coax Transformer (Smith Chart); Impedance, Current and Voltage Along Feed Lines; Two- and Four-Element Vertical Arrays; The L-Network; Series/Short Input L-Network (Iteration); Shunt/Short Impedance Network; Line Stretcher (Pi and T) Stub Matching; Parallel Impedances (T Junction); SWR Value and SWR Iteration; Radiation Angle for Horizontal Antennas; Coil Calculation; Gamma-Omega and Hairpin Matching; Element Taper
- OH4UN-Yagi-Design** The Analyze Module: Generic Dimensions; Element Strength; Element Taper; Mechanical Yagi Balance; Yagi Wind Area; Matching; Optimize Gamma/Omega; Feed-Line Analysis; Rotating Mast Calculation

W1DYJ Larry Banks

SW: ARRL Antenna Book (23rd Edition - 2015)

- TLW** Computes parameters for transmission lines and antenna-tuner
- YW** Computes parameters for Yagi-Uda antennas
- HFTA** Evaluates the effect of local terrain on the launch of HF signals
- Plus Supplemental Files on the CD
- EZNEC** General Antenna Modeling SW (on Web)

Many of the apps from previous editions are available at www.arrl.org/antenna-book

- AAT** Automatically evaluates antenna tuner networks
- Arrayfeed1** Computes parameters necessary for feeding 2-element and 4-element phased arrays
- GAMMA** Computes the parameters for a gamma match
- LPCAD30** For computing LPDA designs
- MOBILE** Evaluating and designing mobile whip antennas and coils
- Range-Bearing** Computes the range-bearing from one lat/lon point to another
- SCALE** Scales Yagi designs to other frequencies

W1DYJ Larry Banks

TLW - Transmission Line Program for Windows

R. Dean Straw - N6BV ©ARRL

Basic Purpose:

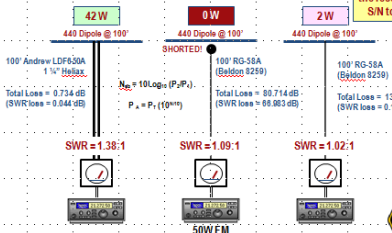
- Input = cable type, frequency, and dimensions, and load impedance
- Output = SWR at input, load, and feedline loss

W1DYJ Larry Banks

TLW - Transmission Line Program for Windows

Answer: **Beware the Myth of low SWR!**

And it affects the received S/N too!



42W, 0W, 2W

440 Dipoles @ 100'

100' Andrew LDF50A 1" x 1/2" Heliax

100' RG-28A (Belden 8230)

100' RG-58A (Belden 8230)

Total Loss = 0.734 dB (SWR loss = 0.044 dB)

Total Loss = 80.714 dB (SWR loss = 68.863 dB)

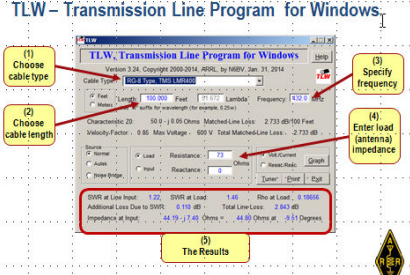
Total Loss = 13.885 dB (SWR loss = 0.154 dB)

SWR = 1.38:1, SWR = 1.09:1, SWR = 1.02:1

50W FM

W1DYJ Larry Banks

TLW - Transmission Line Program for Windows



(1) Choose cable type

(2) Choose cable length

(3) Specify frequency

(4) Enter load (antenna) impedance

The Results

W1DYJ Larry Banks

TLW - Transmission Line Program for Windows

Coax	SWR @70cm	Loss @70cm	Delivered Power			
			2M	10M	80M	
1 1/4" Heliax	1.38:1	0.734 dB	42W	46	48	49
1/2" Heliax	1.31:1	1.544 dB	35W	41	45	49
LMR 400 "RG8"	1.22:1	2.843 dB	26W	34	46	47
8267 RG213	1.12:1	5.283 dB	15W	25	34	46
LMR 240 "RG8X"	1.12:1	5.377 dB	14W	25	33	45
LMR 200 "RG58"	1.08:1	7.142 dB	10W	19	28	43
9258 "RG8X"	1.05:1	9.081 dB	6W	16	27	43
8258 "RG58A"	1.02:1	13.885 dB	2W	2	19	41

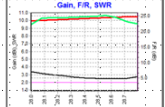
50 W @ Transmitter / 100' Coax

March Membership Meeting ~ Continued Antenna Modeling ~ Larry Banks, W1DYJ

W1DYJ / Larry Banks

YW – Yagi for Windows

R. Dean Straw ~ N6BV ©ARRL



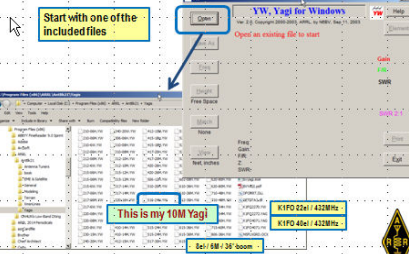
Purpose:

- Input = dimensions of traditional monoband Yagis
- Output = graphs/patterns of Gain, F/R, SWR

W1DYJ / Larry Banks

YW Example: 5el 10M yagi

Start with one of the included files



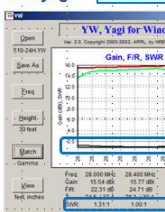
This is my 10M Yagi

5el 10M / 30' boom

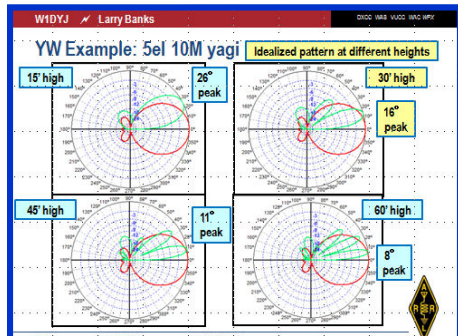
W1DYJ / Larry Banks

YW Example: 5el 10M yagi

30' high, matched



SWR is "tamed".



W1DYJ / Larry Banks

YW Example:

What's really going on with different heights?

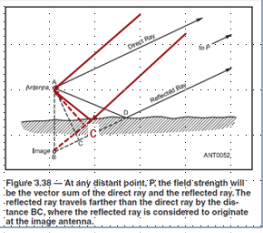
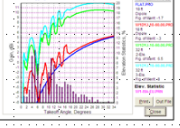


Figure 3.38 — At any distant point, P, the field strength will be the vector sum of the direct ray and the reflected ray. The reflected ray travels farther than the direct ray by the distance BC, where the reflected ray is considered to originate at the image antenna.

W1DYJ / Larry Banks

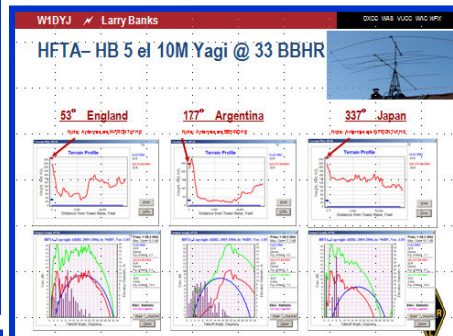
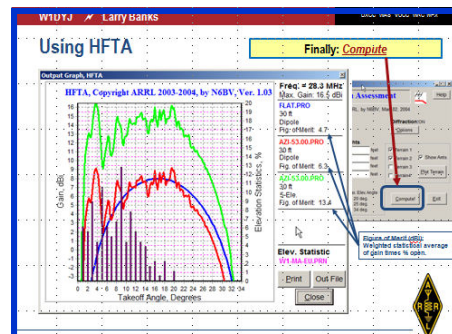
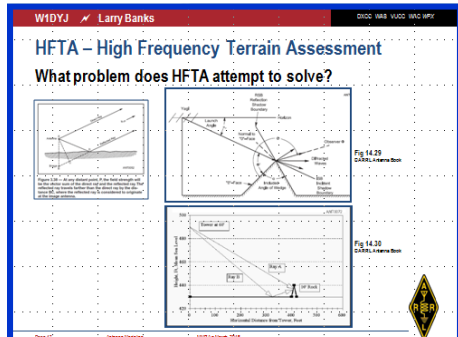
HFTA – High Frequency Terrain Assessment

R. Dean Straw ~ N6BV ©ARRL



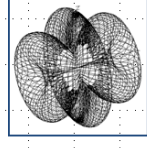
Purpose:

Assesses the effect of uneven local terrain on the transmission and reception of HF signals.

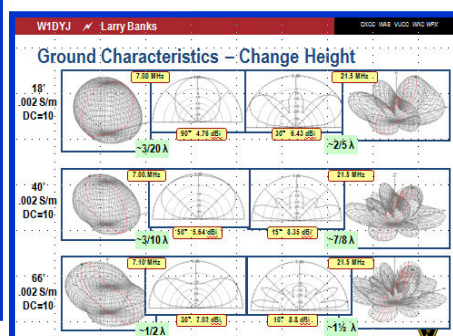
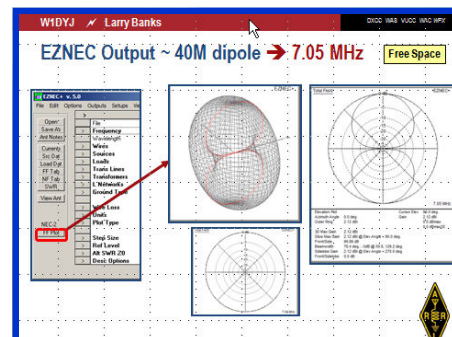


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EZNEC



Basic Purpose: from an X-Y-Z "wires" description of an antenna, generate tabular and graphical outputs of SWR, far field response, RF antenna currents, etc.



W1DYJ / Larry Banks

Conclusions

- You Can't Beat Physics
- Understanding antennas → understanding ANTENNA SYSTEMS
 - HOW YOU WANT TO USE YOUR ANTENNA
 - EFFECTS OF TRANSMISSION LINES
 - LOCAL TERRAIN
 - GROUND CHARACTERISTICS
- All antennas are COMPROMISES
- All models are SIMPLE EXAMPLES of reality
- Your real antenna WILL NOT MATCH your model

This presentation is on Larry's Home Page, at:
<http://www.qsl.net/w1dyj/Antenna%20Modeling%20Talk.pdf>

Upcoming MMRA Meetings

Wed, 25 May ~ Membership Meeting
Programming Your Radio with CHIRP ~ James Lee N1DDK
and Annual Meeting: Officers Report and General Elections
Northborough Public Library

Wed, 15 June ~ Business Meeting
Location: Stratus, Maynard

Saturday, 10 Sept ~ Mid-summer Get Together
Boxboro ARRL Convention
Holiday Inn, Boxborough

Work Party!

Marlborough East
June 18th at 10AM
Contact Bob, K1IW,
for details:

K1IW@mmra.org

Don't Forget! Join Us.

Every Tuesday @ 8 PM
Technical, Informational and Other
Stuff Net

The MMRA's repeaters are linked Tuesday nights for the TIOS Net. Keep up with what's happening in the MMRA and ask your ham related questions.

Net Control Operators:

Week 1	WA1JIM	Jimmy Devaire
Week 2	W1DYJ	Larry Banks
Week 3	KC1CLA	Ed Curley
Week 4	K1KWP	Kevin Paetzold
Week 5	KB1OQA	Tom Turner

To connect using Echolink / IRLP during the Net:

- Echolink Conference *NEW-ENG2*
- IRLP node 4133

Previous issues of the MMRA Newsletter are available at:
www.mmra.org → [Newsletter Archive](#) (on the left)

MMRA Leaders

Officers

President	Bob DeMattia	K1IW
Vice President	Steve Telsey	N1BDA
Secretary	John McGovern	W1JMC
Treasurer	Kevin Paetzold	K1KWP
Clerk	Bob Evans	N1BE
* Technical Officer	Bryan Cerqua	W1BRI

Board of Directors

Director »2017	Steve Schwarm	W3EVE
Director »2017	Roger Coulson	WA1NVC
Director »2016	Clark Conti	N1NVK
Director »2016	Mike Neilsen	W1MPN

Repeater Trustees

* Belmont 145.430	James Lee	N1DDK
* Boston 927.0625	Rick Zach	K1RJZ
* Boston 146.820	John Mullaney	K1BOS
* Brookline 145.160	Joyce DeMattia	N1QPH
* Brookline 146.820 Rcvr	Bob Phinney	K5TEC
* Hopkinton 223.940	James Cahill	KB1LOY
* Hopkinton 449.575	Bryan Cerqua	W1BRI
* Lowell 442.250	Vince De La Flor	K1LVF
* Marlborough 53.810, Quincy 146.670;	Bryan Cerqua	W1BRI
* Marlborough: 29.68, 144.390, 147.270, 224.880, 448.225, 449.925, 927.700 — all as W1MRA		
	Bill Northup	N1QPR
* Mendon 146.610	Kevin Paetzold	K1KWP
* N. Reading 146.715	Bruce Pigott	KC1US
* N. Reading 446.775	Larry Banks	W1DYJ
* Quincy 224.40	Bill Dunn	N1KUG
* Weston 146.790	Bob Evans	N1BE
* Weston 224.700	Eddie Mulhern	N1NOM
* Weston 442.700	David Wolfe	KG1H

Additional, non-Voting

* Newsletter Editor	Larry Banks	W1DYJ
* Emerg. Coord.	Kevin Paetzold	K1KWP
* Pub. Serv. Coord.	David Wolfe	KG1H
* VEC Liaison	Bill Wade	K1IJ
* Net Manager	Larry Banks	W1DYJ
* Web Page Editor	Bob DeMattia	K1IW

* Appointed

MMRA VE Sessions

Third Saturday

9 AM at the Marlboro Public Library

Contact: Bill Wade, K1IJ 781-891-9079

Evenings 6 - 10 PM Weekends 8 AM to 10 PM.

Accredited by the ARRL VEC

Annual Meeting ~ Wednesday, May 25 ~ 7 PM
MMRA Officers Report to Members & General Election
Programming Your Radio with CHIRP

James Lee N1DDK

Location: Northborough Public Library (see page 3)

Talk-in 147.27

Calendar of Ham Radio Flea Markets

For more information: <http://mit.edu/w1gsl/Public/ne-fleas>

14 May E Greenbush NY EGARA @FireCo
21 May Goshen CT SoBARC @FG
21 May Brookline NH NEARC Antiqe @EvtCr
4 Jun Hermon ME PSARA @8 @HS
5 Jun Bethpage NY LIMARC @Briercliff
5 Jun Fishkill NY MtBARC @CorrectionalQWL
11 Jun Windsor CT VR+C Mus 115 Pierson LN
13 Aug St Albans VT STARC @VFW @8
6 Aug Milo ME PARC 8AM@Kiwanis
20 Aug Windsor ME AARA @FG
28 Aug Adams MA NoBARC @BoweFld
28 Aug Newtown CT CARA @TownHall
17 Sep Forestdale RI RIAFMRS @VFW
9,11 Sep Boxboro MA FEMARA NE Conv

10 Sep Windsor CT VR+C Mus 115 Pierson LN
24 Sep Brookline NH NEARC Antiqe @EvtCr
9 Oct Queens NY HoSARC @HoS
14,15 Oct Deerfield NH NEARfest XX @FG
16 Oct Meriden CT Nutmeg @Sheraton
29 Oct Gails Ferry CT TCARC @FireCo
30 Oct Hicksville NY LIMARC @Levitt Hall
12 Nov Bourne MA FARA @UpperCC VoTech
3 Dec Windsor CT VR+C Mus 115 Pierson LN

THE MINUTEMAN REPEATER ASSOCIATION

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Stow, MA. 01775-0669

Email: contact@mmra.org



WE'RE ON THE WEB
[HTTP://WWW.MMRA.ORG/](http://www.mmra.org/)